

OTS: 60-31,081

JPRS: 3053

7 March 1960

ARTIFICIAL PRECIPITATION WORK
IN COMMUNIST CHINA IN 1959

[Translation]

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19981208 078

U. S. JOINT PUBLICATIONS RESEARCH SERVICE
205 EAST 42nd STREET, SUITE 300
NEW YORK 17, N. Y.

FOREWORD

This publication was prepared under contract by the UNITED STATES JOINT PUBLICATIONS RESEARCH SERVICE, a federal government organization established to service the translation and research needs of the various government departments.

JPRS: 3053
CSO: 3397-D

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IN COMMUNIST CHINA IN 1959

K'uo-hsueh T'ung-pao
[Science Bulletin]
No 23, 11 December 1959, Peiping
Pages 789-790
Chinese, per

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During last year's imposing great forward leap, accomplishments in meteorological science were magnificent, and artificial precipitation was one of the subjects in which much progress was made.

After a short period of preparation, and with only a limited technical force, the work started in Kirin in the first part of August last year. Following this experimentation, more work was conducted in the Chi-lien Mountain area in the Northwest, in the provinces of Hupeh, Hopeh, Anhwei, and many other areas. By the end of last year, some results were obtained on ground as well as airplane operations in these areas; in addition, local meteorologists in some areas were also starting their artificial precipitation work after a short training period.

This year many provinces have relied upon their local forces to carry out further experimentation; in the meantime, some areas in particular have conducted artificial rainfall experiments. Many of the experiments were successful although some of the scientific data collected were somewhat qualified; but in general the emphasis on scientific data collection has been given clear attention, and the possible use of instruments has also been sped up. Meteorologists have participated in the work to use local methods to eliminate the threat of hail. They have observed personally the action of locally made guns; some of the phenomena are very impressive and reveal the potential of artificial precipitation work. Studies to observe the physics of cloud and fog have begun. During the actual process of observation, homemade instruments have been continuously improved, and some experiences have been acquired in the observation of the water content of cloud and fog, cloud and rain drop spectrum, etc.

Accomplishments of the past year were not only in the initial stage of development, but more important is that we have gradually built up our strength. Many of us who had no contact with artificial precipitation and cloud-fog physics in the past are now either carrying out field experimentation, or preliminary theoretical studies, or are making useful instruments that meet the required standard. To do field work while carrying out study and research is the most effective way to carry out the speedy development of a project.

The artificial precipitation work in the past year, in my opinion, is proceeding in the right direction and is making satisfactory progress in a healthy atmosphere.

To control the weather by mankind is one of the important tasks which meteorological workers are striving to achieve. Although it is true that there is still a large gap in the complete control of weather under present scientific and technical conditions, however, artificial effects on clouds and fog have been quite successful. Prior to the great forward leap, the Institute of Geophysics was actively interested in weather forecasting which, of course, is still an important, and an urgent need of national economic departments. But forecasting and analysis are not enough to satisfy the grand expectation of changing nature as demanded by the working masses during the great forward leap.

We did not understand this point until the party made it clear to us, then we correctly decided to proceed rapidly with research in artificial precipitation.

In order to have artificial precipitation, the study of cloud-fog physics is essential. It is not correct to say that we were not interested in this work in the past; but the lack of correct methods and approach, and the hope that we could first develop our cloud-fog physics, followed by artificial precipitation work, hindered the progress of both. This way of thinking on this matter was completely reversed during the great forward leap movement. We decided first to start on artificial precipitation, which first promotes the development of cloud-fog physics research, and then to realize a better understanding of the important contents of such physics by actual contact with many practical problems. During the past two decades, the progress of cloud-fog physics has been very rapid and nearly three thousand papers have been published in this field. If we had spent more time and slowly studied these papers in the first place as we used to do, our progress would have been delayed, and we would not have a clear understanding of the significance and mutual relationship of these problems, which would leave us with no idea about which papers we ought to study. But today, we are able not only to comprehend cloud-fog physics, but the work is closely related to the practical situation and is being developed rapidly.

High speed development is no doubt extremely important to a scientifically backward country such as ours. We all know that the development in many branches of modern sciences is very rapid; if our speed in the establishment of such sciences is low, we will never be able to satisfy the demand of our forward leaping socialist construction and we will never be able to catch up to the advanced standard maintained by other nations of the world.

The procedure for artificial precipitation work has been completely reversed: instead of specialized research followed by step-by-step promotion and expansion as used in the past, work began with the masses who have been under the leadership of local party and political authorities. Since the beginning of the great forward leap, people have suggested that we try to store and obtain as much water as possible to guarantee the success of the agricultural and industrial goals of this great movement. It is due to this stimulation that the artificial precipitation work has obtained the leadership of local party and political authorities and the active participation of local meteorological workers right from the beginning. The rapid progress during the past twelve months symbolizes the triumph that can be achieved when scientific work follows the line of the people.

The progress in the past twelve months has not only been rapid but also healthy; the work is now realizing more detailed and more solid achievements. And as with the beginning of any other work, we have defects. The high speed of development with poor technical strength created problems which stem in part from the lack of a careful inspection of precipitation results. But this was discovered on our way toward further forward progress, and therefore it either has been or is being overcome.

Based on our experience, we have learned that such work should have more experiments closely based on the needs of production. Natural conditions should be used to the maximum extent, and more topo-clouds should be formed. Following these steps will bring us more hopefully to practical results. However, artificial precipitation everywhere in the world is still in the early stage of development. Since many complicated factors are involved in the weather process plus the great mobility of air, the duration of artificial precipitation experimentation should be estimated. China is situated in a region of lower latitude where water vapor, water content in clouds, convection activity, and the forced elevation of dynamic heat forces are comparatively strong and the terrain condition is more complicated. Therefore, topo-clouds, which are favorable in artificial precipitation, are abundant in this country. These are the advantageous natural conditions for the development of artificial precipitation experiments. If we can maintain the principle of political leadership and the line of the masses, our future work will be a continuous meaningful development.

Hail-elimination work also deserves our attention. Meteorological workers, through actual observation, have seen certain experiences the people have had in forecasting hail warnings. The experiences obtained by the people of Lin-chao in the north and by the people of Ho-ching in the south are identical. This can't be a coincidence. As for the result, it is unlike what some of the "orthodox" cloud-fog physicists have called unreliable, it is full of theory. From this year's observation, we have found that the problems now stem from the low standard of our meteorological work as well as in the lack of better understanding and summarization of the experiences of the people. The local method deserves further experimentation, and through experiments the work of artificial precipitation may be pushed further. However, other hail elimination methods should also be studied.

To obtain better data for scientific evaluation, much more work should be done on the design and manufacturing of cloud-fog physics instruments. We not only need proper airplane survey instruments, but also instruments which can penetrate the heart of strong convection currents. There are lots of secrets waiting to be solved inside such clouds. In addition, we shall study the properties of special types of nimbi, such as very light and very heavy types, special observation of topo-clouds, etc. The conclusions about these clouds will bear direct revelation on artificial precipitation. Here we have to point out that due to the lack of study, we do not understand, nor can we control, the clouds in tropical areas.

Theoretical work is also very important. Work such as instrument design, quantity of agent used, result analysis, and data evaluation all depend on the direction given by theoretical understanding for better performance. The lack of theoretical guidance will result in the lack of pre-operational preparations and definite conclusions after the work is finished; consequently, a significant project may be inconclusive. Such a situation will definitely give no help to the quick elevation of the standard of our artificial precipitation project.

We should learn more and better the advanced rich experiences of the Soviet Union in artificial precipitation and cloud-fog physics. During the past two decades, it has continuously carried out large scale systematic and organized experimentation and research, and a number of outstanding achievements have been obtained in this field. These facts are even recognized by Britain, the United States of America, and other capitalist and imperialist countries. In the development of artificial precipitation projects, I believe we must learn from the Soviet Union.

Looking back at last year's magnificent artificial precipitation project, we can feel the greatness and rightness of the Party's general line, the great forward leap movement, and the policy which unified the vigorous working attitude and scientific analysis. Through the study of the anti-rightist movement, we can comprehend even better the spirit of the Party's general line and the great leap movement. We will try all possible means to change the status of artificial precipitation and cloud-fog physics work which, we believe, will leap forward even further under the correct leadership of the Party and with the vigorous striving of every comrade worker.

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